

1 **CLAIMS**

2 What is claimed is:

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- 4 1. A method comprising:
- 5 providing image data; and
- 6 performing a Hough transform on the image data using a host
- 7 processor and an operatively configured graphics processor.
- 8
- 9 2. The method as recited in Claim 1, wherein the graphics processor is
- 10 configured to count votes in a resulting Hough transform voting
- 11 buffer.
- 12
- 13 3. The method as recited in Claim 1, wherein the graphics processor is
- 14 configured to convolve image values and provide corresponding
- 15 results to the host processor.
- 16
- 17 4. The method as recited in Claim 1, wherein the graphics processor
- 18 performs an alpha-blending operation that selectively increments
- 19 accumulators that correspond to parameter combinations that are
- 20 likely associated with an observation.
- 21
- 22 5. The method as recited in claim 1, wherein the graphics processor
- 23 performs a histogram computation to find the maxima value in the
- 24 Hough transform voting buffer.
- 25

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2 6. An apparatus comprising:
3 a host processor configured to provide image data; and
4 a graphics processor operatively coupled to the host processor and
5 configured to perform selected steps of a Hough transform algorithm
6 on the image data in association with the host processor.
7
- 8 7. The apparatus as recited in Claim 6, further comprising a local
9 memory operatively coupled to the graphics processor and wherein
10 the graphics processor is configured to count votes in a resulting
11 Hough transform voting buffer within the local memory.
12
- 13 8. The apparatus as recited in Claim 6, wherein the graphics processor
14 is configured to convolve image values and provide corresponding
15 results to the host processor.
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- 17 9. The apparatus as recited in Claim 6, further comprising a local
18 memory operatively coupled to the graphics processor and wherein
19 the graphics processor performs an alpha-blending operation that
20 selectively increments accumulators within the local memory that
21 correspond to parameter combinations that are likely associated with
22 an observation.
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- 24 10. The apparatus as recited in claim 6, further comprising a local
25 memory operatively coupled to the graphics processor and wherein

1 the graphics processor performs a histogram computation to find the
2 maxima value in the Hough transform voting buffer within the local
3 memory.

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- 5 11. A computer-readable medium having computer-executable
6 instructions for performing steps comprising:
7 providing image data; and
8 performing a Hough transform on the image data using a host
9 processor and an operatively configured graphics processor.
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- 11 12. The computer-readable medium as recited in Claim 11, having
12 computer-executable instructions that cause the graphics processor
13 to count votes in a resulting Hough transform voting buffer.
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- 15 13. The computer-readable medium as recited in Claim 11, having
16 computer-executable instructions that cause the graphics processor is
17 to convolve image values and provide corresponding results to the
18 host processor.
- 19
- 20 14. The computer-readable medium as recited in Claim 11, having
21 computer-executable instructions that cause the graphics processor
22 to perform an alpha-blending operation that selectively increments
23 accumulators that correspond to parameter combinations that are
24 likely associated with an observation.
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1 15. The computer-readable medium as recited in claim 11, having
2 computer-executable instructions that cause the graphics processor
3 to perform a histogram computation to find the maxima value in the
4 Hough transform voting buffer.

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6 16. A method comprising:
7 causing dedicated graphics hardware to support a at least one of the
8 following steps associated with a Hough transform algorithm:

9 quantizing a bounded portion of a parameter space that may contain
10 a desired feature;

11 for each discrete quantized parameter combination, allocating an
12 incrementable accumulator;

13 gathering observations that can be mapped into the parameter space;

14 for each observation, incrementing each of the accumulators that
15 corresponds to parameter combinations that may have produced the
16 observation; and

17 determining the maxima in a resulting quantized parameter array and
18 the corresponding parameter combinations.
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